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Job Nr. 2358
August, 1970

Declass Review by NSA/DOD

FINAL REPORT

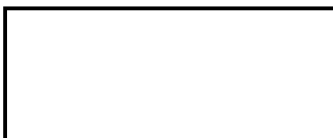


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IMAGERY EXPERIMENTATION SUPPORT

FISCAL YEAR 1970

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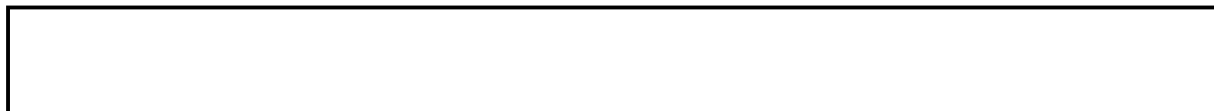
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File No. 50035

IMAGERY EXPERIMENTATION SUPPORT
FINAL REPORT
FOR 1 JULY 1969 THROUGH 30 JUNE 1970

Introduction:

General

Work performed by [redacted] over fiscal year 1970 consisted of four tasks. Task I involved the administration of a study dealing with the identification of ground order of battle targets on line-scan and photographic imagery. Task II involved [redacted] directing of two camera flight tests. Task III included coordinating three aerial flight programs over military facilities; analyzing the imagery; collecting ground truth; and taking photographs of the targets. Two complete packages of all the targets were assembled for an additional ground order of battle study. Task IV provided assistance in the image simulation for a ground order of battle study utilizing "real targets" on aerial photography.

Task I

The administration of the ground order of battle study using models as targets ran for approximately three weeks. In addition to the forty subjects at NPIC, ten subjects from [redacted] also served as subjects for the study. The results of the study were delivered to [redacted] produced the final report. Target identification boards of the models contained on the imagery were built and arranged by [redacted]

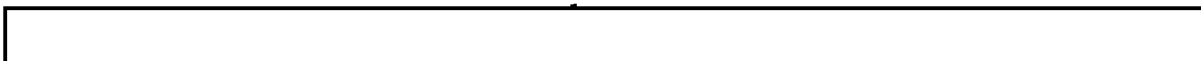
The expenditures for this task were approximately [redacted]

Task II

The two camera flight tests involved checking out a camera system that would provide [redacted] ground resolution, defined by reading a set of tri-bar targets. These targets were made at various contrasts for the test. Many camera runs were flown covering a wide range of shutter speeds and aperture settings. The optimum setting turned out to be an aperture of $f/4$ and a shutter speed of $1/380$ second for the [redacted]. The flight tests took place at [redacted]

A report of the flight tests was produced at the end of the program.

The expenditures for this task were approximately [redacted]



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Task III

The collection of aerial photography over military field forces took place at three locations, Aberdeen Proving Grounds, Maryland, Fort Meade, Maryland, and Redstone Arsenal, Huntsville, Alabama.

The first acquisition program took place at Aberdeen Proving Grounds, Maryland where the target area was a World War II museum of tracked vehicles and artillery. The resolution estimated by reading the object and bar targets was approximately [redacted] in the center and forward portion of the frame format. Two flights were made, one in the morning and the other in the afternoon. See Figures 1 and 2. The attached image evaluation forms, see Figures 3 and 4, are examples of those used for all the flights. They contain the optimum resolution for each flight line over the resolution targets.

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The Huntsville acquisition program took place over the Redstone missile display area in Huntsville, Alabama. See Figure 5. Flight line plots were made and overall flight coordination was handled by [redacted]. Photos and ground truth were collected at the time of the overflights.

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The final flight program took place at Fort Meade, Maryland over the Sixth Armored Cavalry motorpool. See Figure 6. The weather conditions were poor for the aerial acquisition, with strong winds up to 25 knots and large cumulus clouds. Many duplicate flight lines were flown and a small portion of the imagery turned out to provide the best quality of all the acquisition programs. The resolution was judged to be between [redacted]

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Total funds expended for this task were approximately [redacted]

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Task IV

This task provided assistance in selecting and evaluating examples for the imagery simulation. The simulation changed scales and resolutions from an original high quality negative. This work was performed by [redacted]

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The funds expended for this task were approximately [redacted]

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PHOTO (U)

FIGURE 1 TARGETS AT ABERDEEN PROVING GROUNDS

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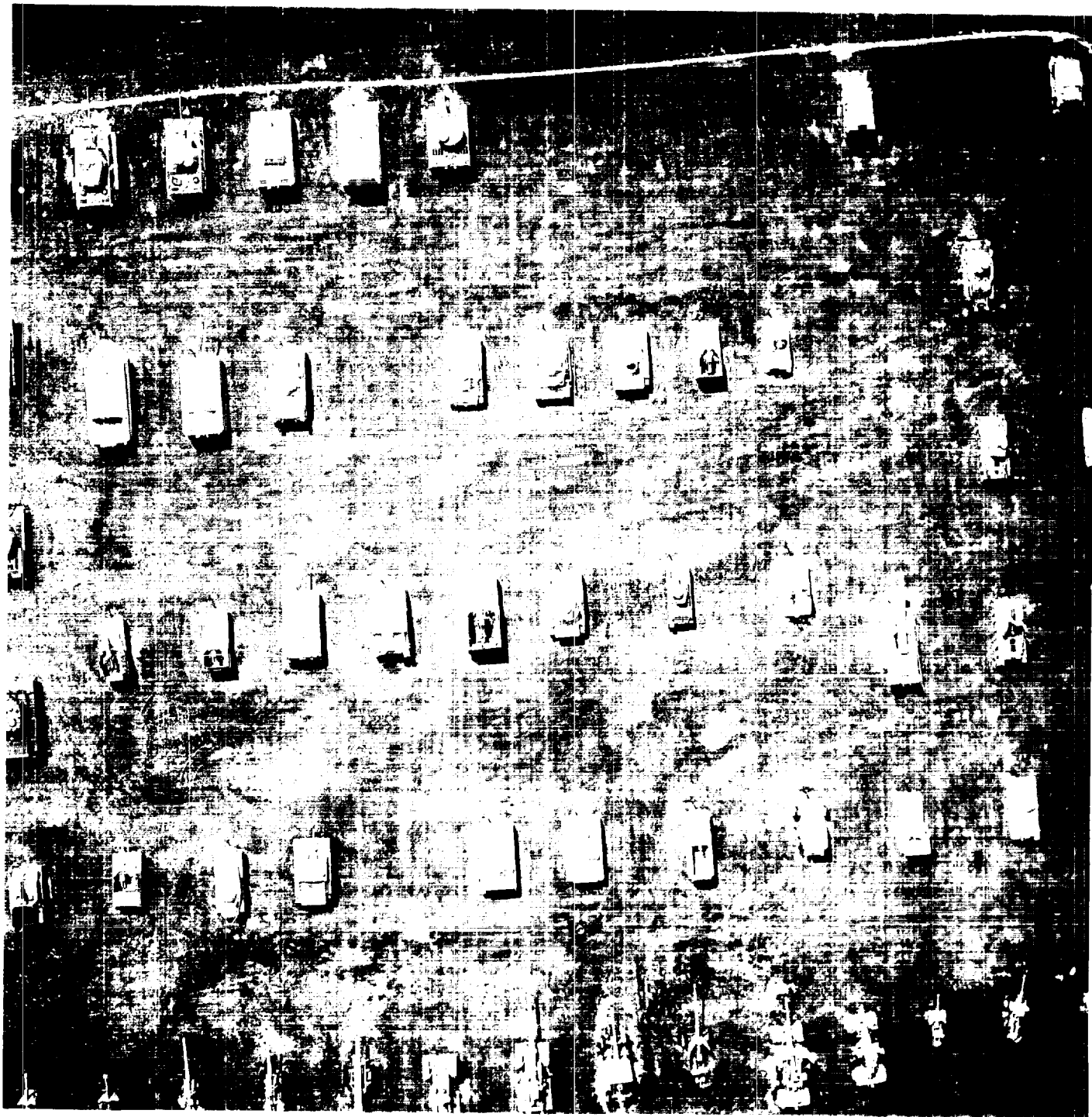


PHOTO (U)

FIGURE 2 TARGETS AT ABERDEEN PROVING GROUNDS

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PHOTO (U)

FIGURE 5 TARGETS AT HUNTSVILLE, ALABAMA REDSTONE ARSENAL

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PHOTO (U)

FIGURE 6 TARGETS AT FORT MEADE SIXTH ARMORED CAVALRY.

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Trips taken in support of the contract were as follows:

Four one day trips to Aberdeen, Maryland
Two one day trips to Fort Meade, Maryland
Two one day trips to Rochester, New York
One two day trip to Huntsville, Alabama
Four one day trips to Germantown, Maryland

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ARMS CONTROL AND DISARMAMENT AGENCY
TIE-ON TO SUPPORT SERVICES CONTRACT

Introduction:

General

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This contract, performed by [redacted] involved four tasks. Task I was a photo interpretation study on the movement of biological and chemical warfare materials by train. Task II was a study paper on an over-head reconnaissance reference base for arms control needs. Task III was a study on existing and advanced sensors' capabilities applied to prospective arms control targets and Task IV was to provide representative examples of field forces and analogous Warsaw Pact forces as a function of photographic ground resolution.

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Task I



The approximate funds expended for this effort were [redacted]

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Task II

This task was a study on the development and utilization of an all-source reference base to be used as a tool by an arms control inspectorate for monitoring a mutual balanced force reduction. This study focused, in particular, on the European environment and the prospective [redacted] area. The study outlined concept and procedures, input and output material, and an updating procedure for the imagery-derived reference base. The reference system proposed builds upon the existing data handling techniques utilized by the Intelligence Community.

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The approximate funds expended were [redacted]

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[REDACTED]

Task III

This task involved current and planned advanced systems and their capabilities for arms control verification purposes. A few hundred targets and status conditions were analyzed in matrix form for each sensor system. The parameters considered included detectability; timeliness and area coverage needed; sensor vs. weather capability; and the identification of the target with and without a collateral data base. References of film and reports were also placed in the matrix form and Vu-Graphs of representative imagery were made.

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[REDACTED]

Funds expended for this task were approximately

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[REDACTED]

Task IV

This task referenced some prior and current GOB studies performed for NPIC on target classification and identification as a function of photographic resolution, as these, in turn, relate potentially to arms control R&D requirements. Warsaw Pact targets, analogous to those covered over Aberdeen Proving Grounds and Fort Meade, were referenced.

The funds expended for this task were

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[REDACTED]

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[REDACTED]

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